I. *The Conſtruction of a Quadratrix to the Circle, being the Curv deſcribed by its Equable Evolution.*

1. BY the *Equable Evolution* of a Circle, I mean ſuch a gradual approach of its Periferie to *Rectitude*, as that all its parts do *together*, and *equally* evolve or unbend: or ſo that the ſame Line becomes ſucceſſively a leſs and leſs Arc of a reciprocally greater Circle.

2. Let A H K A (Fig. 6.) be the Periferie of a Circle. A E a Tangent to the point A. Let this Circular Line be ſuppos'd cut or divided at A, and then to unbend (like a *Spring*) its upper end remaining fixt to its Tangent A E, whilſt the other parts do *Equally Evolve* or extend themſelves thorough all the degrees of leſs Curvature (as in ABD, AMC, *&c.*) till they become ſtraight in coincidence with the Tangent AE.

3. Let AMC be the *Evolving Curv* in any middle poſition between its firſt and laſt. Joyn the fixt end A, and the moving end C, by the Chord-line AC, interſecting the firſt Circle at H. I ſay that AMC is a *like* Segment to A n H, cut off in the firſt Circle by the Chord A H. For, by the ſuppoſition of AMC is the Arc of a Circle, having AE a Tangent common both to it and A n H, and both Arcs are terminated in the ſame Right line AC.

4. Hence the Curv ADCE (deſcrib'd by the moving end of the Periferie in its Evolution) may be thus conſtructed. Let the Circle AHKA be by biſections divided into any number of equal parts. Let H be one of the points of ſuch diviſion. Then ſay, as the number of equal parts in the Arc A n A: is to the number of parts in the whole Periferie A H K A :: ſo is the Chord A H: to a fourth Line, which let be A C in A H produc'd. So is C a point in the Curve A D C E.

5. Dem. Upon A C deſcribe A M C, an Arc *like* to the Arc A n H. Whence— A H: A C :: A n H: A M C. But by conſtruction, A H: A C:: A n H: perif: A H K A, therefore is the Arc AMC equal to the whole Periferie AHKA

and

and like to the Arc A n H. Conſequently AMC repreſents the Evolving Periferie, in a poſition like to the Arc A n H, and C is the deſcribing point.

6. After the ſame manner may be found other points thro which the Curv may be drawn. But here (as in the old *Quadratrix* of *Dinoſtratus*) the point E cannot be preciſely determined but the Curv may be brought ſo near it, that its flexure or tendency will ſo lead to the point E, that A E ſhall be near enough to the truth for common uſes.

7. Suppoſing the point E found, a *Tangent* to any point of the Curv may be drawn: and ſuppoſing a *Tangent* drawn, the point E may be determined; the property of the Tangent being this, that ſuppoſing R T a Tangent to the point C and C A, C E, drawn from C to each end of the rectify'd Circle, the Angle ACT (the leſſer angle that AC makes with the tangent) is equal to the tangent made by the 2 Lines drawn from C.

8. c be a point in the Quadratrix indifinitely near to C; and draw A c interſecting AHKA in h, and AMC in o. To A c as a chord, draw the Arc Amc like unto the Arc A n a. To the point c of the Arc A M C draw the Tangent CL =A E, and joyn L A: So is oC an indefinitely little particle of the Arc coincident with its Tangent.

9. Becauſe of the like Segments AnhA, AMoA, AmcA, as chord Ac: to chord Io:: So is Arc Amc (=AMC): to Arc AMo. Or Ac: Ao:: Amc (=AMC): AMo. And dividing Ac: Ao (=co): Ao:: AMc—AMo (=Co): AMo. That is, co: Ao:: Co: AMo. and alternately, co: Co:: Ao: AMo. Put AC for Ao, and AMC for AMo (as differing infinitely little) and then 'tis co: Co:: AE: AMC. But by conſtruction CL=AE =AMC whence co: Co:: AC: CL and the Angle LCA=Coc. (oc being infinitely near to AC, is therefore parallel to it.) and therefore Coc, ACL are *like Triangles*.

10. Becauſe of CL =AE, Ang. EAC = LCA. (CL and EA being Tangents to the two ends of the ſame circular Arch AMC, make equal Angles with its chord AC.) and AC common to both, the Triangles EAC, ACL are *like* and *equal*: therefore are all three Coc, ACL, EAC *like Triangles*. Whence it follows, that the Angle ACE (in the Triangle EAC) is equal to the Angle ocC (in the Triangle coC.) But ocC = ACT becauſe oc and AC are parallel; therefore Ang. ACE =ACT. QED.